

CLAIMS

1. A heat storage unit comprising:

a storage container that houses a heat storage body, which stores heat by a state change from solid to liquid, and a heat exchange medium, which exchanges heat by directly contacting said heat storage body, has a smaller specific gravity than that of said heat storage body, and is separated from said heat storage body;

a supply pipe that passes through at least said heat storage body housed in said storage container and supplies said heat exchange medium into the storage container; and

a discharge pipe that discharges said heat exchange medium housed in said storage container to the outside of said storage container, wherein

said supply pipe crosses a boundary surface between said heat exchange medium and said heat storage body housed in said storage container, has a plurality of discharge holes that discharge said supplied heat exchange medium, and

at least one of said discharge holes is positioned inside said heat exchange medium.

2. The heat storage unit according to Claim 1, wherein

said supply pipe crosses vertically with respect to said boundary surface.

3. The heat storage unit according to Claim 2, wherein

said supply pipe is disposed coaxially around the circumference of an

area having said discharge holes and has a circulation pipe to allow said heat exchange medium discharged from said discharge holes to go up in the vertical direction.

4. The heat storage unit according to Claim 1, wherein

in the case where said supply pipe or at least a part of said first supply pipe extends in the horizontal direction,

said discharge holes are provided for an area extending in the horizontal direction such that the holes are open in the vertically downward direction.

5. The heat storage unit according to Claim 1, wherein

in said heat storage body,

said supply pipe or said first supply pipe has an expanded portion that is in a shape that widens toward the end and provided with said discharge holes on the bottom surface.

6. The heat storage unit according to Claim 1, wherein

a connection port of said supply pipe is positioned above a connection port of said discharge pipe.

7. The heat storage unit according to Claim 1, comprising:

wave-absorbing plates that are parallelly arranged with each other along the boundary surface between said heat storage body and said heat exchange medium and arranged vertically with respect to said boundary

surface, and prevents agitation on said boundary surface.

8. The heat storage unit according to Claim 1, wherein

said discharge pipe includes a separation mechanism that separates said heat storage body and said heat exchange medium.

9. The heat storage unit according to Claim 8, wherein

said separation mechanism has a separator for allowing said heat exchange medium and said heat storage body, which were taken in, to flow horizontally in one direction and a discharge hole that discharges said heat storage body, which is being precipitated, from said separator, and

said separator has a shape for guiding said precipitated heat storage body toward said discharge hole.

10. The heat storage unit according to Claim 1, wherein

said heat storage body is erythritol.

11. A heat storage unit comprising:

a storage container that houses a heat storage body, which stores heat by a state change from solid to liquid, and a heat exchange medium, which exchanges heat by directly contacting said heat storage body, has a smaller specific gravity than that of said heat storage body, and is separated from said heat storage body;

a supply pipe that passes through at least said heat storage body housed in said storage container and supplies said heat exchange medium

into the storage container; and

a discharge pipe that discharges said heat exchange medium housed in said storage container to the outside of said storage container, wherein said supply pipe includes:

a first supply pipe having discharge holes that discharge said supplied heat exchange medium into said heat storage body; and

a second supply pipe that crosses the boundary surface between said heat exchange medium and said heat storage body, which are housed in said storage container, and has an outlet that discharges said supplied heat exchange medium into the heat exchange medium.

12. The heat storage unit according to Claim 11, wherein

in said heat storage body,

said second supply pipe surrounds at least a part of said first supply pipe including said discharge holes and has a communicating portion that guides said discharge holes to said heat exchange medium.

13. The heat storage unit according to Claim 11, wherein

a switching valve for switching supply and cutoff of said heat exchange medium depending on the state of said heat storage body is provided severally for said first and second supply pipes.

14. The heat storage unit according to Claim 11, wherein

in the case where said supply pipe or at least a part of said first supply pipe extends in the horizontal direction,

said discharge holes are provided for an area extending in the horizontal direction such that the holes are open in the vertically downward direction.

15. The heat storage unit according to Claim 11, wherein

 in said heat storage body,

 said supply pipe or said first supply pipe has an expanded portion that is in a shape that widens toward the end and provided with said discharge holes on the bottom surface.

16. The heat storage unit according to Claim 11, wherein

 a connection port of said supply pipe is positioned above a connection port of said discharge pipe.

17. The heat storage unit according to Claim 11, wherein

 wave-absorbing plates that are parallelly arranged with each other along the boundary surface between said heat storage body and said heat exchange medium and arranged vertically with respect to said boundary surface, and prevents agitation on said boundary surface.

18. The heat storage unit according to Claim 11, wherein

 said discharge pipe includes a separation mechanism that separates said heat storage body and said heat exchange medium.

19. The heat storage unit according to Claim 18, wherein

said separation mechanism has a separator for allowing said heat exchange medium and said heat storage body, which were taken in, to flow horizontally in one direction and a discharge hole that discharges said heat storage body, which is being precipitated, from said separator, and

 said separator has a shape for guiding said precipitated heat storage body toward said discharge hole.

20. The heat storage unit according to Claim 11, wherein
 said heat storage body is erythritol.

21. A heat storage unit comprising:

 a storage container that houses a heat storage body, which stores heat by a state change from solid to liquid, and a heat exchange medium, which exchanges heat by directly contacting said heat storage body, has a smaller specific gravity than that of said heat storage body, and is separated from said heat storage body;

 a supply pipe that passes through at least said heat storage body housed in said storage container and supplies said heat exchange medium into said storage container; and

 a discharge pipe that discharges said heat exchange medium housed in said storage container to the outside of said storage container, wherein

 said supply pipe includes:

 a first supply pipe having an outlet that discharges said supplied heat exchange medium into said heat exchange medium housed in said storage container housed in said storage container; and

a second supply pipe that has at least a part of said first supply pipe inside the pipe and has discharge holes that discharge said supplied heat exchange medium into said heat storage body.

22. The heat storage unit according to Claim 21, wherein

in the case where said supply pipes are provided parallelly in said heat storage body,

a thermal conduction member for conducting heat of said supply pipes is provided.

23. The heat storage unit according to Claim 22, wherein

at least a part of said supply pipe is provided on the bottom surface of said storage container.

24. The heat storage unit according to Claim 21, wherein

said second supply pipe is provided on the bottom surface of said storage container so as to cover said bottom surface.

25. The heat storage unit according to Claim 21, wherein

a connection port of said supply pipe is positioned above a connection port of said discharge pipe.

26. The heat storage unit according to Claim 21, comprising:

wave-absorbing plates that are parallelly arranged with each other along the boundary surface between said heat storage body and said heat

exchange medium and arranged vertically with respect to said boundary surface, and prevents agitation on said boundary surface.

27. The heat storage unit according to Claim 21, wherein

said discharge pipe includes a separation mechanism that separates said heat storage body and said heat exchange medium.

28. The heat storage unit according to Claim 27, wherein

said separation mechanism has a separator for allowing said heat exchange medium and said heat storage body, which were taken in, to flow horizontally in one direction and a discharge hole that discharges said heat storage body, which is being precipitated, from said separator, and

said separator has a shape for guiding said precipitated heat storage body toward said discharge hole.

29. The heat storage unit according to Claim 21, wherein

said heat storage body is erythritol.